

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2005/000240

International filing date (day/month/year)
24.01.2005

Priority date (day/month/year)
23.01.2004

International Patent Classification (IPC) or both national classification and IPC
A01N35/02, A01N25/28, A01N35/06, A01N35/04, A01N31/16, A01N31/08, A01N31/04, A01N31/02, A01N27/00

Applicant
EDEN RESEARCH PLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Molina de Alba, J

Telephone No. +49 89 2399-7823



**WRITTEN OPINION OF THE
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	4,6,9-11,15,18-35,37,39-55
	No: Claims	1-3,5,7,8,12-14,16,17,36,38,56-58
Inventive step (IS)	Yes: Claims	15
	No: Claims	1-14,16-58
Industrial applicability (IA)	Yes: Claims	1-58
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1) Reference is made to the following documents:

- D1: US-A-4 049 828 (COLE ET AL) 20 September 1977 (1977-09-20)
- D2: DATABASE WPI Section Ch, Week 198026 Derwent Publications Ltd., London, GB; Class C03, AN 1980-45625C XP002335785 & JP 55 064736 A (YOSHIDA T) 15 May 1980 (1980-05-15)
- D3: US-A-5 662 915 (OKIOGA ET AL) 2 September 1997 (1997-09-02)
- D4: EP-A-1 106 070 (INABONOS, S.A) 13 June 2001 (2001-06-13)
- D5: US-A-4 032 551 (WILLETT ET AL) 28 June 1977 (1977-06-28)
- D6: US-A-4 743 620 (HODGIN ET AL) 10 May 1988 (1988-05-10)
- D7: US-B1-6 534 078 (STRZEMIEMSKI THOMAS M ET AL) 18 March 2003 (2003-03-18)
- D8: WO 03/020024 A (XIMED GROUP PLC; FRANKLIN, LANNY, U) 13 March 2003 (2003-03-13)
- D9: EP-A-0 242 135 (AD2 LIMITED; AD2 LTD) 21 October 1987 (1987-10-21)

2) The present application relates to a method of killing nematodes comprising the step of applying a nematicidal composition comprising a terpene component. The application further relates to the preparation of a nematicidal composition comprising hollow glucan particles encapsulating a terpene component.

3) Re Item V

3.1 Novelty (Art. 33(2) PCT)

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-3, 5, 7, 8, 12-14, 16, 17, 36, 38, and 56-58 is not new in the sense of Article 33(2) PCT:

D1 describes (cf. abstract and Claim 6) the insecticidal, nematicidal, and insect repellent properties of citral. This terpene at concentrations of 0.02% in soil reduces the nematode population in 99.5%, as shown in the example on col. 1, l. 47-52. D1 anticipates the subject-matter of present claims 1-3, 7, 8, 12-14, 16, 36, 38, and 56-58.

D2 discloses (cf. abstract) a method of extermination of soil nematodes by spraying soil with an aqueous solution of human vermicide. Suitable vermicides include santonin, Corsican weed, ethylene tetroxide, hexylresorcinal, and thymol. The content of **D2** is relevant to the novelty of claims 1-3, 7, 17, 36, 38, and 56-58.

D3 relates to (cf. abstract; col. 1, l. 58-66; col. 2, l. 37-39; and col. 3, l. 2-28) a product for killing subsurface and surface soil pathogens including nematodes. The product comprises an extract derived from the plant *Tagetes minuta*. Considering the terpene content of *Tagetes minuta* extracts, **D3** renders the subject-matter of claims 1-3, 36, 38, and 56-58 not novel.

D4 deals with (cf. abstract and pg. 3, l. 42-53) compositions suitable for post-harvest treatments containing an edible surfactant and an active ingredient selected from the association of thymol, eugenol, or cinnamaldehyde with one of cuminaldehyde, geraniol, vanillin, borneol, menthol, anethole, terpineol, limonene, and glycosides of mustard and jasmine. The compositions are used in the treatment of post-harvest pathologies, mainly against fungi, insects, bacteria, and nematodes. **D4** is relevant for the novelty of claims 1, 7, 56, and 57.

D5 relates to (cf. abstract; col. 2, l. 18-21; and Claim 1) a neutral lipid fraction derived from sugar beet, which is effective for hatching the cysts and eggs of sugar beet nematodes. The lipid fraction appears to be a terpenoid (cf. col. 2, l. 32-48 and col. 4, l. 60-68). Thus, the subject-matter of claims 1, 5, 56, and 57 is not novel.

The documents **D6** and **D7** disclose (cf. **D6**: abstract, col. 3, l. 34-35, col. 4, l. 31-34, and Claim 1; **D7**: col. 2, l. 10-12 and l. 57-65 and claims 2, 3, and 12) compositions for the control of nematodes, wherein limonene is used as a solvent. The content of **D6** and **D7** anticipates the subject-matter of claims 1, 2, 5, 7, 17, 36, 38, and 56-58.

Consequently, only the subject-matter of claims 4, 6, 9-11, 15, 18-35, 37, and 39-55 appears to be novel.

3.2 Inventive Step (Art. 33(3) PCT)

The subject-matter for which novelty cannot be acknowledged may neither be regarded as

inventive. Accordingly, the following examination in terms of inventive step has been restricted to the subject-matter of claims 4, 6, 9-11, 15, 18-35, 37, and 39-55.

The documents **D1** and **D2** are considered to represent the closest state of the art for claims 4, 6, 9-11, 15, 18-35, and 37.

D9 is regarded as the closest state of the art for the methods of claims 39-55. **D9** discloses (cf. abstract) a method of producing an encapsulated material into the cell wall of a microorganism. Among the materials which may be encapsulated essential oils and nematocides are cited (cf. pg. 3, l. 5-13) and illustrated in the examples. The encapsulated compounds usually exhibit a higher stability and may be released in a controlled way (cf. pg. 4, l. 7-12). In the examples, cell walls of *Saccharomyces cerevisiae* (brewer's or baker's yeast) has been used to encapsulate several essential oils (examples III-VI, XI, XIV, XVI, XVII, XVIII, XIX) and pesticides. Example XIII shows encapsulation of the nematicidal compound dichlorphen.

The methods of claims 4, 6, 9-11, 18, and 37 differ from those of the closest prior art in that they involve the use of a suspension of the terpene, a particular surfactant, acidic conditions, encapsulation of the terpene into a liposome, or repeated application of the nematicidal composition. These slight changes come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Some of these techniques may be found, for example, in **D8**, which discloses (cf. abstract) compositions and methods for prevention and treatment of plant infections, involving the use of a single terpene, a terpene mixture, or a liposome-terpene composition. Terpenes such as citral are thus formulated as solutions, which may be taken up by the plant (cf. pg. 25, l. 23-29), or as suspensions or liposomes, for which no uptake was detected (cf. Example 8 and pg. 22, l. 4-11). Hence, the subject-matter of claims 4, 6, 9-11, 18, and 37 lacks an inventive step.

The particular selection of methods represented by the subject-matter of Claim 15 differs from **D1** and **D2** in that it selectively kills root-knot nematodes over saprophagous nematodes. As the cited documents are silent about this property, such a method may be regarded as inventive. Nevertheless the claimed method is defined in terms of the result to be achieved,

which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result (see point 5 below).

The subject-matter of claims 19-35 differs from **D1** and **D2** in that the nematocidal agent is encapsulated into hollow glucan particles. This alternative formulation is however obvious in the light of **D9** and may not be regarded as inventive.

The preparation of nematocidal compositions comprising hollow glucan particles as in claims 39-55 is equally obvious in view of a combination of the documents **D9** and **D1** or **D2**, which suggests the preparation of baker's yeast microcapsules containing citral as nematocidal agent.

Accordingly, an inventive step may only be acknowledged for the method of Claim 15.

3.3 Industrial applicability (Art. 33(4) PCT)

Is acknowledged for the whole set of claims.

4) Re Item VII

The documents cited in the description do not appear to be essential to the performance of the invention as required by Article 5 PCT. Thus, the phrases on pg. 10, l. 4 and 18-19 should be deleted (see PCT Guidelines ISPE 4.26).

5) Re Item VIII

The subject-matter of Claim 15 is obscure, since its definition in terms of the result to be achieved does not allow the skilled person to know which are the technical features necessary to successfully carry out the invention. Therefore, Claim 15 contravenes Article 6 PCT. This also applies to claims 39 and 55, in which the conditions of incubation of the terpene component and the glucan particles are not defined by actual technical features.

The registered trade marks in claims 5, 29, and 45 have no precise meaning as they are not internationally accepted as descriptive terms, thereby rendering the definition of the these

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claims unclear (Art. 6 PCT).

The relative terms "about", "around", and "approximately" used in claims 10-14, 30-34, 47, 51, and 52 have no well-recognised meaning and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claims unclear (Art. 6 PCT).

Claim 7 is not clear (Art. 6 PCT) in that the reader cannot ascertain if vitamin A is mentioned merely as an example of carotene or if it intends to limit carotenes to only vitamin A.

Claim 20 is inconsistent or redundant with Claim 19. In any case, it should be clarified (Art. 6 PCT).

Claims 3 and 49 are unclear (Art. 6 PCT). The fact that these claims refer to "a solution" and "a true solution" raises a doubt about what the Applicant understands by a solution and thus about the scope claimed.

Claim 58 is not clear (Art. 6 PCT) for several reasons. Firstly, the claim does not indicate who and in which sense or for which purposes the compounds are regarded as safe. Secondly, such a classification is certainly not fixed but susceptible of changing in time.